



Docket No.: M4065.0067/P067
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Warren M. Farnworth

Application No.: 09/118,080

Group Art Unit: 2827

Filed: July 17, 1998

Examiner: A. Chambliss

For: LEAD OVER CHIP SEMICONDUCTOR
DEVICES WITH A BALL GRID ARRAY (AS
AMENDED)

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AMENDMENT

Commissioner for Patents
Washington, DC 20231

Dear Sir:

In response to the Office Action dated July 17, 2002 (Paper No. 19), please amend the above-identified U.S. Patent application as follows.

In the Claims

Please replace claim 13 with the following rewritten claim 13:

13. (Four times amended) A tape for semiconductor devices, said tape comprising:

a single dielectric layer having openings;

electrically conductive leads associated with said openings, said leads being printed on said dielectric layer; and

a low temperature curing adhesive material that cures to about ninety percent of its maximum strength within two to three hours without exceeding one hundred fifty degrees Fahrenheit, said low temperature curing adhesive material being located between a semiconductor chip and said dielectric layer.

REMARKS

Reconsideration and allowance of this application, as amended, are respectfully requested. Claim 13 has been amended; claims 1-7, 10-18, and 31-33 remain pending in the application. The objection and rejections are respectfully submitted to be obviated in view of the amendments and remarks presented herein.

In the Amendment, claim 13 has been editorially amended in response to the objection to the preamble, and to the rejection under Section 112, second paragraph. Reconsideration and withdrawal of the objection and the rejection are respectfully requested.

35 U.S.C. 103(a) – Heo in view of admitted prior art

Claims 1, 2, 4-7, 10-14, and 16-18 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over U.S. Patent No. 5,858,815 to Heo et al. (hereinafter “Heo”) in view of the admitted prior art, Master Bond Polymer System EP31 (“Master Bond”). The Office Action asserts that with respect to Claim 1, “Heo discloses a semiconductor chip 11, a single dielectric layer 20 (i.e., multi-layer film having a non-conductive film layer 21), an electrically conductive lead 26 (i.e., conductive circuit pattern) on the dielectric layer 20, and adhesive 30 (i.e., epoxy) located between the semiconductor chip 11 and the dielectric layer 20 (see col. 5, lines 18-36; Fig. 4B).” The Office Action acknowledges that “Heo fails to disclose a low temperature curing adhesive material that cures to about 90% of its maximum strength within 2 to 3 hours without exceeding 150°F,” but

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relies upon Applicant's disclosure of the Master Bond Polymer System EP31, asserting that "Heo and the Admitted Prior Art both disclose substantially the same environment of an epoxy as an adhesive in structural bonding applications." The Office Action concludes that "one skilled in the art would have readily recognized substituting the EP31 epoxy for the epoxy taught by Heo, since the EP31 epoxy has a high peel strength and good adhesion to a variety of materials including metals, plastics, rubbers, ceramics, and glass in structural bonding applications as taught by the Admitted Prior Art (Master Bond Polymer System EP31)."

Applicant respectfully disagrees, and the rejection under § 103(a) is respectfully traversed. The combined disclosures would not have rendered obvious the embodiments of the invention defined by any of the pending claims. Regardless of what Master Bond may teach, there is no suggestion whatsoever in Heo to employ the adhesive disclosed by Master Bond. The claimed invention would not have been obvious because there is no suggestion or motivation, either in the references or in the knowledge generally available to one of ordinary skill in the art, to combine reference teachings to attain the claimed invention.

There is no suggestion in Heo of employing any particular adhesive material, let alone Applicant's claimed adhesive material. Heo discloses simply using "an epoxy adhesive or an adhesive film" (column 5, line 20). Applicant however, employs the claimed low temperature curing adhesive material for a specific utility – to avoid misalignment between the chip and the single dielectric layer caused by differential thermal expansion (specification page 4, lines 20-22; page 10, lines 10-13). See also specification page 4, lines 4-6, where Applicant

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teaches that “[t]he low temperature curing adhesive material avoids misalignment problems that would be caused by a heat activated adhesive.”

Applicant respectfully submits that the rejection is based on impermissible hindsight reconstruction. The reconstruction is impermissible because it includes knowledge that was gleaned only from Applicant’s disclosure. Heo discloses simply using “an epoxy adhesive or an adhesive film.” There is no evidence whatsoever that Heo contemplated the potential misalignment problems described by Applicant, let alone that Heo contemplated the use of Applicant’s claimed low temperature curing adhesive material as a means to avoid such misalignment.

The rejection of claims 3 and 15 is similarly traversed. Each of claims 3 and 15 depends from an independent claim that is allowable for the reasons discussed above with respect to the rejection of claims 1, 2, 4-7, 10-14, and 16-18. Chang adds nothing to rectify the deficiency associated with the asserted combination of Heo and Master Bond.

The rejection of claims 31-33 is also traversed. Applicant’s claim 31 defines a semiconductor device that comprises in pertinent part “an anisotropically conductive material located between said single dielectric layer and said semiconductor chip.” Heo discloses an “adhesive means 30” that “comprises an epoxy adhesive or an adhesive film” (column 5, lines 18-20). Regardless of what Akagawa may disclose with regard to an insulation layer, there is

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no suggestion in the asserted combination of Applicant's claimed semiconductor device comprising an anisotropically conductive adhesive material.

For at least the above reasons, reconsideration and withdrawal of each of the rejections under § 103(a) are respectfully requested.

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to withdraw the outstanding rejection of the claims and to pass this application to issue.

Dated: November 18, 2002

Respectfully submitted,

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